ranslation

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY
(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference PD0408090	FOR FURTHER ACTION See Form PCT/IPEA/416	
International application No. PCT/CN2004/001218	International filing date (*day/month/year*) 27.Oct.2004 (27.10.2004)	Priority date (*day/month/year*) 04.Nov.2003 (04.11.2003)

International Patent Classification (IPC) or national classification and IPC
IPC7 A01N59/16 A01N25/08

Applicant
ZHAO Jian et al.

1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of 3 sheets, including this cover sheet.
3. This report is also accompanied by ANNEXES, comprising:
   a. ☒ *(sent to the applicant and to the International Bureau)* a total of 3 sheets, as follows:
      ☒ sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).
      ☐ sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.
   b. ☐ *(sent to the International Bureau only)* a total of (indicate type and number of electronic _____), containing a sequence listing and/or tables related thereto, in electronic form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).
4. This report contains indications relating to the following items:
   - ☒ Box No. I Basis of the report
   - ☐ Box No. II Priority
   - ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
   - ☐ Box No. IV Lack of unity of invention
   - ☒ Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
   - ☐ Box No. VI Certain documents cited
   - ☐ Box No. VII Certain defects in the international application
   - ☐ Box No. VIII Certain observations on the international application

Date of submission of the demand	Date of completion of this report
25.May2005 (25.05.2005)	22.July2005 (22.07.2005)
Name and mailing address of the IPEA/CN The State Intellectual Property Office, the P.R.China, 6 Xitucheng Rd., Jimen Bridge, Haidian District, Beijing, China 100088 Facsimile No. 86-10-62019451	Authorized officer LI Xinzhi Telephone No. (86-10)62085684

Form PCT/IPEA/409 (cover sheet) (April 2005)

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.
PCT/CN2004/001218

Box No. I Basis of the report

1. With regard to the language, this report is based on:

☒ the international application in the language in which it was filed

☐ a translation of the international application into _____, which is the language of a translation furnished for the purposes of:

☐ international search (Rules 12.3(a) and 23.1(b))

☐ publication of the international application (Rule 12.4(a))

☐ international preliminary examination (Rules 55.2(a) and/or 55.3(a))

2. With regard to the elements of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report)*:

☐ the international application as originally filed/furnished

☒ the description:

pages 1-2, 4-8 as originally filed/furnished

pages * 3 received by this Authority on 25.May2005 (25.05.2005)

pages * _____ received by this Authority on _____

☒ the claims:

pages _____ as originally filed/furnished

pages * _____ as amended (together with any statement)under Article 19

pages * 9-10 received by this Authority on 25.May2005 (25.05.2005)

pages * _____ received by this Authority on _____

☒ the drawings:

pages 1/1 as originally filed/furnished

pages * _____ received by this Authority on _____

pages * _____ received by this Authority on _____

☐ a sequence listing and/or any related table(s) - see Supplemental Box Relating to Sequence Listing.

3. ☒ The amendments have resulted in the cancellation of:

☐ the description, pages _____

☒ the claims, Nos. 13

☐ the drawings, sheets/figs _____

☐ the sequence listing *(specify)*: _____

☐ any table(s) related to sequence listing *(specify)*: _____

4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).

☐ the description, pages _____

☐ the claims, Nos. _____

☐ the drawings, sheets/figs _____

☐ the sequence listing *(specify)*: _____

☐ any table(s) related to sequence listing *(specify)*: _____

* *If item 4 applies, some or all of those sheets may be marked "superseded."*

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.
PCT/CN2004/001218

Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement:

Novelty (N)	Claims	1—12	YES
	Claims		NO
Inventive step (IS)	Claims	1—12	YES
	Claims		NO
Industrial applicability (IA)	Claims	1—12	YES
	Claims		NO

2. Citations and explanations (Rule 70.7)
   1. The claimed subject-matter is not anticipated or suggested by the documents cited in the International Search Report. So claims 1~12 meet the criteria set out in PCT Article 33(2) and 33(3).
   2. Claims 1～12 are considered to meet the criteria set out in PCT Article 33(4), they have industrial applicability clearly.

的水合固体基质而得以制备。该含二价银的固体杀菌剂虽然解决了上述液体状态的二价银杀菌剂所存在的问题，但在该含二价银的固体杀菌剂中，由于二价银不是通过离子交换而负载在固体载体上，因此，仍然存在着产品长期存放的稳定性问题。并且由于该固体杀菌剂组合物具有水溶性，而使其应用领域受到限制，即，只能用于对泳池、浴盆和工业用冷却装置中的水进行清洁。

CN1286915 提供了一种高价银磷酸盐无机抗菌剂，其通过将作为载体的磷酸钛钾盐粉末加到硝酸银水溶液中，使一价银离子与磷酸钛钾中的钾发生离子交换而负载在磷酸钛钾载体上。然后经过滤、洗涤和在 1000℃煅烧处理后，再将获得的一价银固体抗菌剂分散到水中，用过硫酸钾或过硫酸钠进行氧化，并经再次过滤、洗涤和高温煅烧获得含有二或三价银的固体抗菌剂。该方法得到高价银固体抗菌剂的制备过程冗长而复杂、成本高，并且含一价银离子的固体抗菌剂在再次分散到水溶液中进行氧化时，固体载体上的部分一价银会被钠离子交换下来。因此，按照所述方法无法获得具有确定含银量的质量稳定的高价银抗菌剂。

因此，还需要更深入地研究开发含有二价银的固体抗菌剂以使其在更广泛的领域中得以应用。

发明内容

本发明旨在提供一种含高价银的无机抗菌剂，其特征在于，其含有基于抗菌剂总量的 2%重量到 6%重量的二价银、三价银或四价银，所述高价银通过离子交换反应负载在固体载体上。

本发明还提供含高价银的无机抗菌剂的制备方法，该方法包括如下步骤：将可进行离子交换的固体载体加入到所述含高价银的溶液中，所述含高价银的溶液中，二价银离子的浓度为 2-8 %重量，优选为 3.5-5%重量；充分搅拌得到的浆状物以使高价银离子与所述固体载体上的可交换离子发生离子交换反应；过滤并干燥得到的固体产物，得到含高价银的无机抗菌剂。

本发明还进一步提供含高价银的无机抗菌剂在抗菌织物、抗菌日用品、抗菌塑料制品、抗菌医疗用品和器械、抗菌建材、抗菌陶瓷、抗菌洁具和抗菌家电中的应用。

溶液。

8. 如权利要求 6 所述的含高价银的无机抗菌剂的制备方法，其中所述的固体载体选自：磷酸锆钠、磷酸钛钠、磷酸锡钠或沸石。

9. 如权利要求 6 所述的含高价银的无机抗菌剂的制备方法，其中所述的固体载体与所述含高价银的溶液的体积比为 1：6-10，优选为 1 ： 8。

10. 如权利要求 6 所述的含高价银的无机抗菌剂的制备方法，其中所述固体载体与含高价银之间的离子交换反应在 pH 为 1 到 5，优选 3 到 3.5，温度为 30℃-80℃，优选为 55℃-65℃，更优选在 55℃的条件下反应 2-8 小时，优选 4 到 6 小时，其中用 20%NaOH 或 KOH 调节反应体系的 pH 值。

11. 如权利要求 6 所述的含高价银的无机抗菌剂的制备方法，其中所述的过滤干燥步骤包括将滤饼充分水洗至 pH 为 5 到 6，优选为 6，并在 110℃到 140℃，优选 120℃干燥 1-2 小时。

12. 如权利要求 11 所述的含高价银的无机抗菌剂的制备方法，该方法还包括煅烧和粉碎步骤，其中煅烧温度为 800℃到 1000℃，优选为 900℃，载银磷酸锆煅烧时间为 2-4 小时；粉碎步骤包括在气流粉碎机中粉碎至平均粒径为 1.0-10.0μm，优选为 1.0-2.0μm 。

溶液。

8. 如权利要求 6 所述的含高价银的无机抗菌剂的制备方法，其中所述的固体载体选自：磷酸锆钠、磷酸钛钠、磷酸锡钠或沸石。

9. 如权利要求 6 所述的含高价银的无机抗菌剂的制备方法，其中所述的固体载体与所述含高价银的溶液的体积比为 1：6-10，优选为 1 ： 8。

10. 如权利要求 6 所述的含高价银的无机抗菌剂的制备方法，其中所述固体载体与含高价银之间的离子交换反应在 pH 为 1 到 5，优选 3 到 3.5，温度为 30℃-80℃，优选为 55℃-65℃，更优选在 55℃的条件下反应 2-8 小时，优选 4 到 6 小时，其中用 20%NaOH 或 KOH 调节反应体系的 pH 值。

11. 如权利要求 6 所述的含高价银的无机抗菌剂的制备方法，其中所述的过滤干燥步骤包括将滤饼充分水洗至 pH 为 5 到 6，优选为 6，并在 110℃到 140℃，优选 120℃干燥 1-2 小时。

12. 如权利要求 11 所述的含高价银的无机抗菌剂的制备方法，该方法还包括煅烧和粉碎步骤，其中煅烧温度为 800℃到 1000℃，优选为 900℃，载银磷酸锆煅烧时间为 2-4 小时；粉碎步骤包括在气流粉碎机中粉碎至平均粒径为 1.0-10.0μm，优选为 1.0-2.0μm 。